

UNIVERSITI SAINS MALAYSIA

PEPERIKSAAN KEDUA
PROGRAM SARJANA FARMASI
SEMESTER II 1992/93

APRIL 1993

FCP 554 : PRAKTIS FARMASI KLINIKAL

(3 HOURS)

This examination consists of two sections.

Section A consists of 100 multiple choice questions.

Section B consists of two(2) long questions.

Answer ALL question.

Answers to section A must be entered into the scripts provided.

...2/-

INDEX NO : _____

SECTION A

1. Which of the following is the most sensitive indicator of protein malnutrition?
 - (a) Creatinine height index.
 - (b) Serum transferrine.
 - (c) Tricep skin fold.
 - (d) Skin turgor.

2. Which of the following statements regarding catheter-related infection is true?
 - (a) It is more common in immunocompromised patient.
 - (b) It is more common with central parenteral nutrition.
 - (c) Frequent flushing with normal saline will reduce its risk of occurrence.
 - (d) It is avoided by frequent monitoring.

3. Which of the following is useful for monitoring carbohydrate load in a patient on respirator?
 - (a) Body weight.
 - (b) Fluid intake and output.
 - (c) Blood gases.
 - (d) Serum albumin.

...3/-

INDEX NO : _____

4. Which of the following statements regarding the use of parenteral nutrition in hepatic failure is true?

..... (a) Carbohydrate is the best source of energy in a patient with hepatic failure.

..... (b) Aromatic amino acids will accelerate hepatic encephalopathy.

..... (c) Medium chain triglyceride preparation is the preferred source of energy.

..... (d) Branch-chain amino acid preparation is the preferred nitrogen source.

5. Which of the following statements regarding pediatric parenteral nutrition solution are true?

(i) It is best prepared to contain one kilocalorie per milliliter.

(ii) It is best administered peripherally.

(iii) It is best prepared in "Three-in-one".

(iv) It always contains a higher amino acid concentration than adult solutions.

..... (a) (i) and (ii) only.

..... (b) (i), (ii) and (iii) only.

..... (c) (i), (ii), (iii) and (iv).

..... (d) (ii) and (iv) only.

...4/-

INDEX NO : _____

6. Adult zinc requirement is affected by

- (i) losses via skin.
- (ii) losses via fistulae.
- (iii) losses via respiration.
- (iv) losses in stool.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

7. Which of the following are causes for hypokalemia in a patient given parenteral nutrition?

- (i) High fistule output.
- (ii) Fluid overload.
- (iii) Post-acidosis state after treatment with sodium bicarbonate.
- (iv) Polyuria.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

...5/-

INDEX NO : _____

8. Which of the following statements regarding tricep skin fold measurement are true?

- (i) It is an indicator for fat storage.
- (ii) It is less sensitive than visceral protein as an indicator for nutritional status.
- (iii) It is used together with mid-arm circumference to calculate protein storage.
- (iv) It is a very useful indicator for nutritional status in community settings.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

9. Which of the following steps are appropriate for the management of catheter-related infection in a patient given central parenteral nutrition?

- (i) Immediate institution of empiric antibiotic therapy.
- (ii) Replacement of parenteral nutrition with dextrose 10% solution.
- (iii) Immediate withdrawal of the central catheter.
- (iv) Addition of heparin into parenteral nutrition solution.

...6/-

INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

10. Which of the following are common sources of central catheter related infections during infusion?

- (i) Hands of nursing staff.
- (ii) Volumetric chambers containing extemporaneously added drug.
- (iii) Breath of patient.
- (iv) The use of a "Y" connector to administer drug.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

11. Which of the following statements are true regarding septicemia in a patient receiving parenteral nutrition?

- (i) It occurs commonly in an immunocompromised patient.
- (ii) It is always associated with other foci of infection.
- (iii) It occurs secondary to poor catheter care.
- (iv) It is always fatal.

...7/-

INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

12. Which of the following complications are associated with central line catheter?

- (i) Air embolism.
- (ii) Hemothorax.
- (iii) Thrombophlebitis.
- (iv) Hemolysis.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

13. Which of the following statements are true regarding hyperglycemia in a patient receiving parenteral nutrition?

- (i) It is associated with hypoinsulinemia.
- (ii) It occurs as a result of rapid infusion of hypertonic solution.
- (iii) Heparin increases the rate of elimination of glucose.
- (iv) It is best managed initially by reducing the rate of infusion.

...8/-

INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

14. Which of the following statements are true regarding hyperlipidemia in patients receiving parenteral nutrition?

- (i) It is associated with familial hyperlipidemia.
- (ii) It is best avoided by adding heparin into the parenteral nutrition solution.
- (iii) It is best managed initially by reducing the rate of infusion.
- (iv) It results in atherosclerosis.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

15. Which of the following problems are associated with the use of drugs in patients receiving parenteral nutrition?

- (i) Interference with laboratory analysis.
- (ii) Alteration of metabolic profile.
- (iii) Alteration of acid-base balance.
- (iv) Precipitation of the parenteral nutrition solution.

...9/-

INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv)
- (d) (ii) and (iv) only.

16. Which of the following tests should be carried out during the commissioning of a laminar flow cabinet?

- (i) Smoke pencil test to determine the presence of turbulent air flow.
- (ii) Dioctylpathalate test to determine the efficiency of HEPA filter.
- (iii) Air velocity test to determine the efficiency of prefilter.
- (iv) Drop plate test to determine the sterility of the laminar flow.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

...10/-

INDEX NO : _____

17. Which of the following statements regarding sterile rooms are true?

- (i) It should always be maintained at a positive pressure.
- (ii) Air cleanliness should be of class 100 grade.
- (iii) Air flow should be laminar.
- (iv) It should be organism free.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

18. Which of the following information are important in the setting up of an intravenous admixture service?

- (i) The latest data on drug compatibility.
- (ii) Data on drug stability as well as the stability of its final solution.
- (iii) Expected number and types of preparations per day.
- (iv) Estimated number of staff required.

...11/-

INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

19. Which of the following criteria related to the selection of staff for the aseptic room are true?

- (i) Good self hygiene.
- (ii) Positive attitude.
- (iii) Panic personality.
- (iv) Sex.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

20. Which of the following determine the total number of staff required in an intravenous admixture laboratory?

- (i) The total number of preparations per day.
- (ii) The types of preparations.
- (iii) The level of staff capability.
- (iv) The distance of the laboratory from the main pharmacy.

...12/-

INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

21. Which of the following can be used to avoid precipitation of calcium phosphate in pediatric parenteral nutrition?

- (i) Using monovalent phosphate ion in the preparation.
- (ii) Using the right sequence of mixing.
- (iii) Using calcium chloride salt in the preparation.
- (iv) Adding albumin into the final solution.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

22. Which of the following statements are true regarding the use of total parenteral nutrition infusion line for the administration of other drugs?

- (i) It is strictly prohibited.
- (ii) It is allowed only for drugs with known compatibility data.
- (iii) It is appropriate through the "Y" connector.
- (iv) It requires pre and post flushing procedures with normal saline.

...13/-

INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

23. Which of the following statements regarding central parenteral nutrition are true?

- (i) It is more susceptible to mechanical problems.
- (ii) It is more likely to be complicated by infection.
- (iii) It is more suitable for hyperosmolar solution.
- (iv) It is the best route for home parenteral nutrition.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

24. Which of the following can be used to estimate energy requirements for parenteral nutrition?

- (i) Body weight.
- (ii) Basal energy expenditure.
- (iii) Age of patient.
- (iv) Sex of patient.

...14/-

INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv)
- (d) (ii) and (iv) only.

25. Which of the following statements regarding infusion of parenteral nutrition are true?

- (i) The rate through the central catheter should be increased gradually.
- (ii) The flow through the peripheral catheter can be stopped abruptly.
- (iii) The flow should be tapered slowly prior to discontinuation.
- (iv) The rate should not exceed 100 ml/hour.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv).
- (d) (ii) and (iv) only.

26. Which of the following are features described by Brodie and Smith regarding drug utilization?

- (i) It is authoritative.
- (ii) It is structured.
- (iii) It is able to analyse and interpret patterns of drug usage against predetermined standards.

...15/-

INDEX NO : _____

(iv) It is able to be used to initiate efforts to correct patterns of drug use not consistent with the predetermined standards.

..... (a) (i) and (iii) only.

..... (b) (ii) and (iv) only.

..... (c) (i), (ii) and (iii) only.

..... (d) (i), (ii), (iii) and (iv).

27. Which of the following are services provided by Drug Information Service to the Pharmacy and Therapeutic Committee ?

(i) Formulary development and maintenance.

(ii) Drug use review.

(iii) Evaluations of drug and drug use policies.

(iv) Coordination of reporting programs.

..... (a) (i) and (iii) only.

..... (b) (ii) and (iv) only.

..... (c) (i), (ii) and (iii) only.

..... (d) (i), (ii), (iii) and (iv).

...16/-

INDEX NO : _____

28. Which of the following references are considered secondary?

- (i) Facts and Comparisons.
- (ii) Current Contents.
- (iii) Drugdex.
- (iv) Medline.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

29. Which of the following should be consulted first when looking for information on drug?

- (a) Current Contents.
- (b) Medline.
- (c) Primary literature.
- (d) General references.

30. Which of the following are reasons for knowing the background information of the requestor requesting for drug information?

- (i) To determine the length and depth of the search.
- (ii) To determine the urgency of the call.
- (iii) To determine the type and sophistication of the response.
- (iv) To determine whether the question is for research or patient care.

...17/-

INDEX NO : _____

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

31. Which of the following features are true regarding the Medline?

- (i) It is a primary reference.
- (ii) It covers more than 3000 biomedical journals.
- (iii) It is updated quarterly.
- (iv) It can be retrieved on-line.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

32. Which of the following features are true regarding the Current Contents Clinical Practice ?

- (i) It is a secondary reference source.
- (ii) It covers more than 700 biomedical journals.
- (iii) It is available on diskettes.
- (iv) It is updated weekly.

...18/-

INDEX NO : _____

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

33. Which of the following features are true regarding the IOWA drug information system?

- (i) It covers about 150 biomedical journals.
- (ii) It is updated monthly.
- (iii) It is only available on microfische.
- (iv) It is a tertiary reference.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

34. Which of the following references are best suited for pharmacist to keep track with the latest development in pharmacy and medicine?

- (i) Applied Therapeutics.
- (ii) Inpharma.
- (iii) Drugdex.
- (iv) Current Contents Clinical Practice.

...19/-

INDEX NO : _____

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

35. Which of the following references actually contain information from the pharmaceutical manufacturers?

- (i) DIMS.
- (ii) British National Formulary (BNF).
- (iii) Physician Desk Reference (PDR).
- (iv) American Hospital Formulary Service-Drug Information .

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

36. Which of the following are reasons for classifying the nature of questions received when handling drug information?

- (i) To determine the type of reference to search first.
- (ii) To determine the urgency of the question.
- (iii) To aid in determining the type of background information.
- (iv) To aid record keeping.

...20/-

INDEX NO : _____

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

37. Which of the following are roles of the pharmacist in the Pharmacy and Therapeutics Committee reviewing request for inclusion of drugs into the formulary?

- (i) To compile and analyse literatures for the committee to review.
- (ii) To characterise advantages of drug under consideration.
- (iii) To characterise disadvantages of drug under consideration.
- (iv) To prepare a document to accept/refute claims of the doctor requesting the drug.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

38. Which of the following references is the most up-to-date and specific or specialised ?

- (a) Reference textbook.
- (b) Drug monographs.
- (b) Primary literatures.
- (d) Secondary references.

...21/-

INDEX NO : _____

39. Which of the following statements are true regarding a general reference ?

- (i) It provides an easy and convenient access to answer the majority of drug information requests.
- (ii) It contains a broad background information on the drug subject in question.
- (iii) It contains information that may represent the interpretation and biasess of the author(s).
- (iv) It acknowledges recent developments in drug literatures even during publication.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

40. Which of the following are objectives of a drug formulary ?

- (i) To provide safe drugs.
- (ii) To provide the cheapest drugs.
- (iii) To provide effective drugs.
- (iv) To limit drug choice to doctors.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

...22/-

INDEX NO : _____

41. Which of the following statements is true regarding a drug formulary ?

- (a) It is a listing of pharmaceuticals and their applications.
- (b) Its development should be guided by the objective "to provide the best drugs at any expense for the patient being served".
- (c) The pharmacy plays a key role in deciding drugs to be listed in the formulary.
- (d) All of the above statements are true.

42. Which of the following are true regarding a topic to be chosen for drug usage evaluation?

- (i) It is drug specific.
 - (ii) It is patient specific.
 - (iii) It is disease specific.
 - (iv) It is doctor specific.
-
- (a) (i) and (iii) only.
 - (b) (ii) and (iv) only.
 - (c) (i), (ii) and (iii) only.
 - (d) (i), (ii), (iii) and (iv).

...23/-

INDEX NO : _____

43. Which of the following information is contained in a typical formulary selection criterion?

- (i) Comparative efficacy.
- (ii) Safety.
- (iii) Comparative cost.
- (iv) Impact on quality of life.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

44. Which of the following background information is least important when handling drug-drug interaction questions?

- (a) Specific drugs suspected.
- (b) Diagnosis/indication for which the drugs are prescribed.
- (c) The time course, dose and route of administration of drugs suspected.
- (d) Patient drug history.

...24/-

INDEX NO : _____

45. Which of the following pairs are properly matched?

- (i) Drugline (Telita) - primary reference.
- (ii) Facts and Comparison - tertiary reference.
- (iii) Poisonsindex - primary reference.
- (iv) International Pharmaceutical Abstracts - secondary reference.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv).

46. Which of the following is/are true of type A adverse drug reaction (ADR) ?

- (i) It accounts for only 20% of ADR incidence.
- (ii) It is predictable.
- (iii) It is associated with a high mortality.
- (iv) It is usually detected during premarketing trials.

...25/-

INDEX NO : _____

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (i), (ii), (iii) and (iv)

47. Which of the following contributes to type A ADR?

- (a) Pharmaceutical impurities.
- (b) Pharmacokinetic alterations.
- (c) Pharmacodynamic alterations.
- (d) Genetic abnormalities.

48. Which of the following steps is/are essential in evaluating an ADR incidence?

- (i) The determination of the chronology of events.
- (ii) The determination of drug concentrations.
- (iii) The identification of other etiologies.
- (iv) The administration of a rechallenge therapy.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (iv) only.

...26/-

INDEX NO : _____

49. Which of the following indicate(s) a potential ADR and should be reported?

- (i) Patient's complaints of dry mouth for which the doctor suggests ice chips.
- (ii) The development of diarrhoea for which the doctor suspects the antibiotics the patient is taking which he then discontinues.
- (iii) The development of drowsiness while taking Benadryl.
- (iv) The development of extrapyramidal symptoms which is treated with benztropine.

- (a) (i) and (iii) only.
- (b) (ii) and (iv) only.
- (c) (i), (ii) and (iii) only.
- (d) (iv) only.

50. Which of the following are objectives of TDM?

- (i) To achieve desired pharmacologic effect.
- (ii) To reduce time for achieving maximal drug effect.
- (iii) To reduce risks of toxicity.
- (iv) To obviate the need to monitor clinical effects.

...27/-

INDEX NO : _____

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

51. Which of the following statements are true?

- (i) Toxicity of theophylline is avoided if plasma concentration is kept below 25 mg/l.
- (ii) TDM for phenytoin is appropriate because there is little objective monitoring parameters available.
- (iii) TDM for gentamicin is appropriate to determine suspected toxicity with rising serum creatinine.
- (iv) Blood for gentamicin concentration is best obtained at peak time to ensure therapeutic effectiveness.

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

...28/-

INDEX NO : _____

52. Which of the following are true about characteristics of drugs routinely monitored in TDM?

- (i) They have narrow therapeutic ranges.
- (ii) There is no clearly observable therapeutic endpoint.
- (iii) There is unpredictable dose-response relationship.
- (iv) The toxicity or lack of effectiveness is dangerous.

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

53. Which of the following are relevant in determining correct sampling time for TDM?

- (i) Reason for TDM.
- (ii) Route of drug administration.
- (iii) Time of administration of dose.
- (iv) Patients' clinical status.

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

...29/-

INDEX NO : _____

54. Which of the following statements are true?

- (i) Enzyme multiplied immunoassay technique (EMIT) is less specific than HPLC.
- (ii) Fluorescence immunoassay technique is more time consuming than the HPLC method.
- (iii) Fluorescence immunoassay technique is more expensive than the HPLC method.
- (iv) The amount of plasma required to assay for drug concentration is less with the EMIT technique compared to the HPLC method.

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

55. Which of the following are important in assessing results of drug concentration determination?

- (i) Disease process.
- (ii) Concurrent drug therapy.
- (iii) Drug pharmacokinetics.
- (iv) Therapeutic objectives.

...30/-

INDEX NO : _____

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

56. Which of the following are true about fluorescence immunoassay?

- (i) Turn around time is rapid.
- (ii) It is very specific.
- (iii) It is sensitive.
- (iv) It is easy to operate.

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

57. Which of the following statements are true?

- (i) The mobile phase in HPLC is usually a gas.
- (ii) Lithium is usually analysed by flame photometry or atomic absorption spectrometry.
- (iii) Bioassay technique for antibiotic requires a high turn around time.
- (iv) Chromatographic technique has the potential of performing multiple drug assay.

...31/-

INDEX NO : _____

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

58. Which of the following statements are true?

- (i) Primary site for the absorption of digoxin is the duodenum and upper jejunum.
- (ii) Absorption of digoxin elixir is superior to the tablet form.
- (iii) IM injection of digoxin is painful.
- (iv) Most of the administered digoxin is eliminated by the liver.

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

59. Which of the following statements are true?

- (i) Aminophylline is less potent than theophylline.
- (ii) Theophylline is mainly excreted in the kidney.
- (iii) Cimetidine reduces daily theophylline requirement.
- (iv) Children eliminate theophylline at a faster rate than adults.

...32/-

INDEX NO : _____

- (a) (i), (ii), (iii) and (iv).
- (b) (i), (ii) and (iii) only.
- (c) (ii), (iii) and (iv) only.
- (d) (i), (iii) and (iv) only.

60. Which of the following statements is true?

- (a) Oral absorption of carbamazepine is slow and erratic.
- (b) Half life for phenytoin is 72 hours.
- (c) Volume of distribution for amikacin is greater than for gentamicin.
- (d) Netilmicin is active against anaerobes.

61. Which of the following statements is true?

- (a) TDM prevents the occurrence of nephrotoxicity with gentamicin.
- (b) The volume of distribution of digoxin is reduced in renal failure.
- (c) Neonates require a lower dose of gentamicin compared to adults (per kg body weight per dose).
- (d) Plasma concentration for lithium is best obtained just before the next dose.

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INDEX NO : _____

62. Which of the following defines pharmaceutical care?

- (a) The responsible administration of drug therapy to achieve definite outcomes that improve patient's quality of life.
- (b) The responsible administration of drug therapy for the purpose of identifying and monitoring of a patient's response.
- (c) The responsible administration of drug therapy for the purpose of monitoring patient medication compliance.
- (d) The responsible administration of drug therapy for the purpose of achieving definite outcomes that improve patient's sense of well-being.

63. Which of the following is not a significant barrier to the provision of effective counseling services ?

- (a) Cultural diversity of the pharmacy's patient population serve by the pharmacy.
- (b) Lack of complete information regarding each prescription.
- (c) Poorly developed communication skills.
- (d) A low educational level of the patient population.

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INDEX NO : _____

64. Which of the following is the most effective 'delivery' style for patient education activities?

- (a) A demanding, controlling approach.
- (b) A quiet, soft spoken approach.
- (c) An authoritarian, business-like approach.
- (d) A confident, authoritative approach.

65. Which of the following is/are advantage(s) of a pharmacist's participation in counseling activities?

- (a) To gather and document important patient information.
- (b) To identify problems with patient medication compliance.
- (c) To reduce the cost of outpatient drug therapy.
- (d) All of the above.

66. Which of the following statements is true regarding communication ?

- (a) It is a static process between people.
- (b) A nonverbal communication sends a stronger message than verbal communication.
- (c) Pharmacists must learn to communicate in a standard format to achieve effective communication.
- (d) Communication skills cannot be improved by participation in communication workshops.

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INDEX NO : _____

67. What is the rate of noncompliance in the ambulatory patient population?
- (a) 10 %.
 - (b) 20 %.
 - (c) 25 % to 50 %.
 - (d) Greater than 50 %.
68. Which of the following is not a major contributor to medication noncompliance ?
- (a) Occurance of side-effects.
 - (b) Socioeconomic status.
 - (c) Patient beliefs about their need for medication.
 - (d) Misinterpretation of directions for the use of medication.
69. Which of the following pharmacist activities will not increase compliance ?
- (a) Provision of information to the patient.
 - (b) Appearance of interest in the patient's well being.
 - (c) Referring patient to the physician for all questions.
 - (d) Educating the patient on the rationale of therapy.

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INDEX NO : _____

70. Which of the following constitutes the difference between patient education and patient information?
- (a) Impersonal attitudes work best for patient education but not for patient education.
 - (b) Attitudinal adjustments are an aspect of patient information and not of patient education.
 - (c) A change in behaviour is the endpoint of education but not of information.
 - (d) Only facts are presented for patient information activity.
71. Which of the following is not an example of drug misuse?
- (a) Overutilization of an agent.
 - (b) Inappropriate self-medication.
 - (c) Individualization of the dosing schedule.
 - (d) Drug usage for non-indicated problems.
72. Which of the following is not a consequence of partial compliance in a patient treated for a chronic bacterial infection?
- (a) The requirement for a more toxic agent.
 - (b) A decreased risk for developing resistant bacteria.
 - (c) The need for the performance of additional tests to evaluate renal function.
 - (d) The need to switch to a more complicated regimen.

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INDEX NO : _____

73. Which of the following variables significantly correlates with patient's compliance to drug therapy?
- (a) Age.
 - (b) Sex.
 - (c) Social status.
 - (d) Education.
74. Which of the following is the most important determinant of compliance during the regimen testing stage?
- (a) Patient's attitudes concerning therapy.
 - (b) Physician's attitudes about therapy.
 - (c) Pharmacist's attitudes about therapy.
 - (d) Patient's personal experience while on drug.
75. Which of the following is the most important reason for preferring a plasma drug concentration determination as a measurement for patient compliance?
- (a) It is the only sufficiently accurate method.
 - (b) It can easily be obtained at the time of the appointment.
 - (c) It allows one to determine if the regimen is therapeutic.
 - (d) It cannot be faked by the patient.

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INDEX NO : _____

76. Which of the following is the most important benefit of a pharmacist's compliance-oriented drug counseling?
- (a) The patient's submission and acceptance of the need for therapy.
 - (b) The intergration of the information into the patient's behavior.
 - (c) The memorisation of the information for future use.
 - (d) All of the above statements are true.
77. Which of the following activities is most important to assist pharmacists to improve interviewing skills?
- (a) Attending continuing education programs.
 - (b) Reading books on related subject.
 - (c) Practising and obtaining feedbacks.
 - (d) Watching others.
78. Which of the following does not constitute a pharmacist's counseling activity?
- (a) The taking of medication history.
 - (b) The monitoring of vital signs.
 - (c) The assessment of medication compliance.
 - (d) The request for additional laboratory tests.

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INDEX NO : _____

79. Which of the following contributes to the optimal, teachable moment in a pharmacist's counseling session?
- (a) The unhurried pace of the pharmacist.
 - (b) A private consultation area.
 - (c) Calling on a patient whose medication is delivered.
 - (d) All of the above.
80. Which of the following is considered in compliance-oriented patient counseling?
- (a) The patient's baseline knowledge on drugs and disease.
 - (b) The patient's beliefs and attitudes towards the therapy being prescribed.
 - (c) The rationale for the drug therapy prescribed.
 - (d) All of the above.
81. Which of the followings does not constitute a patient's drug-taking problems ?
- (a) Self-medication with OTC drugs.
 - (b) Inadequate knowledge on drug side-effects.
 - (c) Modification of the dosage schedule.
 - (d) Exacerbation of asthma.

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INDEX NO : _____

82. Which of the following is not an objective for prescription screening?
- (a) To change the prescription to a more cost-conscious regimen.
 - (b) To check for prescriber's mistakes or errors.
 - (c) To change the prescription in accordance to current institutional policy.
 - (d) To verify the nature of drug allergic reactions.
83. Which of the following content of pharmacist communications with the prescriber to clarify a prescription is considered unprofessional?
- (a) A clear, brief description of the potential problem.
 - (b) A literature reference indicating the clinical significance of the identified problem.
 - (c) A suggestion for an alternative plan to solve the problem.
 - (d) None of the above.
84. Which of the following examples of 'sig' providing adequate instructions for the appropriate use of drug is clearly understandable?
- (a) Take one capsule as needed.
 - (b) Take one tablet every six hours.
 - (c) Take one table-spoonful at mealtimes and at bedtime.
 - (d) Take one tea-spoonful three times a day.

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INDEX NO : _____

85. Which of the following reasons is not true concerning the pharmacists reluctance to participate in the counseling activities?

- (a) The lack of complete information on patient's drug therapy and disease condition.
- (b) The lack of ability to effectively communicate with the patients.
- (c) The lack of time.
- (d) The perceived lack of necessity due to the presence of 'as directed' instructions on prescriptions.

86. Which of the following best depicts the concept of appropriate self-medication when a patient receives a prescription for tetracycline 250 mg. QID.

- (a) Take one capsule at 7 am, 1 pm, 8 pm and just before going to bed.
- (b) Take one capsule 4 times a day with meals.
- (c) Take the medication twice a day but take two capsules each time.
- (d) Take one capsule every six hours along with mixture aluminium-magnesium hydroxide for his ulcer.

87. Which of the following is not considered a medication error?

- (a) Administration of a wrong medication.
- (b) Administration of an extra dose.
- (c) Achievement of a minimal drug waste.
- (d) Administration of an unordered drug.

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INDEX NO : _____

88. Which of the following statements is/are advantage(s) of centralised unit dose distribution system?

- (i) It improves inter-personal communication skill of pharmacists.
- (ii) It enables the sharing of space and personnel for clinical activities.
- (iii) It involves a higher cost of operation.
- (iv) It requires a lower setup and operation costs.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv)
- (d) (iv) only

89. Which of the following is a measure of the quality of a hospital medication system?

- (a) Medication error rates.
- (b) Amount of floor stock.
- (c) Level of inventory control.
- (d) Optimum utilization of personnel.

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INDEX NO : _____

90. Which of the following information should be included in a patient medication profiles?

- (a) A complete record of drug therapy.
- (b) Frequency of drug delivery to the ward.
- (c) Amount of floor stock needed.
- (d) Number of beds to be served.

91. Which of the following statements regarding pharmacy staffing of a Unit Dose System is true?

- (a) It requires less personnel compared to the traditional system.
- (b) Pharmacy assistants are not required to prepare patient doses.
- (c) The hiring of pharmacy assistants would reduce the overall quality of the system.
- (d) It requires more pharmacists compared to traditional system.

92. Which of the following is the primary objective of a hospital quality assurance program?

- (a) To provide a maximum clinical service.
- (b) To optimise on patient care.
- (c) To minimise the number of medication errors.
- (d) To minimise the rate of nosocomial infections.

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INDEX NO : _____

93. Which of the following is not an appropriate objective of a pharmacy quality assurance program?
- (a) To optimise the delivery of pharmacy services.
 - (b) To improve drug therapy.
 - (c) To minimise parenteral drug administration.
 - (d) To minimise medication errors.
94. Which of the following factors is of least priority in selecting patients for monitoring?
- (a) The administration of drugs likely to cause adverse reaction.
 - (b) The administration of multiple drugs.
 - (c) The occurrence of risks for drug induced disease.
 - (d) The administration of radiation therapy.
95. Which of the following information, is/are required in selecting drug therapy.
- (i) Age.
 - (ii) Weight.
 - (iii) Sex.
 - (iv) Results of mental status examination.

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INDEX NO : _____

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv)
- (d) iv only

96. Which of the following statements regarding a centralised unit dose system is/are correct?

- (i) Medication doses are dispensed from a central location except for prepacking and inventory control.
- (ii) Medication doses are prepared in two or more satellites.
- (iii) All doses are dispensed from the satellite, but prepacking and compounding are done in a central location.
- (iv) All procedures are done at a central location including order transcribing, prepacking, medication profiling, inventory control and dose dispensing.

- (a) (i) and (ii) only.
- (b) (i), (ii) and (iii) only.
- (c) (i), (ii), (iii) and (iv)
- (d) (iv) only

...46/-

INDEX NO : _____

97. Which of the following is the main activity of a unit dose system?
- (a) Packaging.
 - (b) Documentation.
 - (c) Delivery.
 - (d) Medication Scheduling.
98. During pharmacy round, an elderly gentleman who received tobramycin for pneumonia was found to have an elevated serum creatinine. Which of the following constitutes an appropriate pharmacist action?
- (a) Evaluation of the clinical status of the patient and recalculation of the tobramycin dose based on the new serum creatinine.
 - (b) Discontinuation of the tobramycin because of renal nephrotoxicity.
 - (c) Request for a urine culture to check for casts.
 - (d) None of the above.
99. Which of the following drugs needs a pharmacokinetic consult because of commonly encountered dosing difficulties?
- (a) Imipenem.
 - (b) Norfloxacin.
 - (c) Theophylline.
 - (d) Diazepam.

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INDEX NO : _____

100. What does the letter "A" in the term "SOAP" stands for?

- (a) Appropriate subjective or symptomatic information.
- (b) Assessment of the problem.
- (c) Action plan.
- (d) All objective information.

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INDEX NO : _____

SECTION B

Question 1

Write short notes on the following topics:

- A. Advantages of unit dose drug distribution system compared to traditional system.

(8 points)

- B. Rationale for monitoring drug therapy especially for patient in an intensive care unit.

(7 points)

- C. Pharmacist's self-preparation for ward round.

(5 points)

- D. Essential components of a quality assurance program in pharmacy services.

(5 points)

...49/-

INDEX NO : _____

Question 2

A 54 year old Malay lady was treated in Hospital Universiti Sains Malaysia for

1. Ascending cholangitis with septicemia.
2. Acute renal failure.
3. Congestive cardiac failure.

with the following medications.

1. Gentamicin 60 mg q 8 (H)
2. Piperacillin 2 g q 6(H)
3. Metronidazole 800 mg IV q 6(H)
4. Frusemide 40 mg IV BD
5. Digoxin 0.25 mg q 24 (H)

5 days after beginning the above therapies, the patient did not improve. He remained febrile and started to develop a more severe pulmonary congestion. The doctor then started the patient on theophylline, 500 mg stat IV and 250 mg tds I.V. 2 days later the doctor ordered for TDM of gentamicin, digoxin and theophylline.

- (A) Discuss your approach to determine appropriate sampling times for the TDM of gentamicin, theophylline and digoxin (when blood should be taken and how many times you need to take the blood)?

(5 Marks)

- (B) The following results were obtained for the plasma concentrations of the respective drugs just prior to the next dose of each ("pre-levels")

Gentamicin	3.4 mg/L
Digoxin	3.2 ng/ml
Theophylline	30.2 mg/l

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INDEX NO : _____

Describe and show how you would interpret the above plasma concentration results.

(10 Marks)

(C) Using the above case as an example, write short notes on the importance of TDM for the given drugs.

(10 Marks)

AppendixNormal Laboratory Values

1.	Ammonia	80-110 mcg/dl	or	47-65 umol/L
2.	Amlase	4-25 IU/ml		
3.	Billirubin			
-	Direct	0-0.2 mg/gl		0-3 umol/L
-	Indirect	0.2-0.8 mg/dl		30-14 umol/L
-	Total	0.2-1 mg/dl		30-17 umol/L
4.	CO ₂	20-30 mEq/L		24-30 mMol/L
5.	pCO ₂	35-45 mmHg		
6.	CI	100-106 mEq/L		100-106 mMol/L
7.	Cpk	50-170 U/L		
8.	Creatinine (SCr)	0.6-1.5 mg/dl		60-130 umol/L
9.	Random blood sugar	70-110 mg/dl		3-10 umol/L
10.	Iron	50-150 mcg/dl		9.0-26.9 umol/L
11.	Lactic dehydrogenase	70-210 IU/L		
12.	Magnessium	1.5-2.0 mEq/L		0.8-1.3 mMol/L
13.	pO ₂	75-100 mmHg		
14.	pH	7.35-7.45		
15.	Acid phosphatase			
	Male	0.13-0.63 IU/ml		36-176 nmol s ⁻¹ /L
	Female	0.101-0.65 IU/ml		2.8-156 nmol s ⁻¹ /L
16.	Alkaline phosphatase	39-117 IU/L		
17.	Phosphorous	3.0-4.5 mg/dl		1.0-1.5 mMol/L
18.	Potassium (K ⁺)	3.5-5.0 mEq/L		3.5-5.0 mMol/L
19.	Calcium (Ca ²⁺)	8.5-10.5 mg/dl		2.1-2.6 mMol/L
20.	Sodium (Na ⁺)	135-145 mEq/L		135-145 mMol/L
21.	Bicarbonate (HCO ₃ ⁻)	24-38 mEq/L		24-28 mMol/L

22.	Protein		
-	Total	6.0-8.5 g/dl	60-85 g/L
-	Albumin	3.5-5.0 g/dl	35-50 g/L
-	Globulin	2.3-3.5 g/dl	23-35 g/L
-	Transferrin	200-400 mg/dl	2.0-9.0 g/L
23.	Transaminase (SGOT)	0-40 IU/L	0-0.32 $\mu\text{mol s}^{-1}/\text{L}$
24.	BUN	8-25 mg/dl	2.9-8.9 mMol/L
25.	Uric Acid	3-7 mg/dl	0.18-0.42 mMol/L
26.	Blood Pictures		
	Red blood cell (RBC)		
	Male	4.8-6.4 x 10 ⁶ /mm ³	
	Female	4.2-5.4 x 10 ⁶ /mm ³	
	White blood cell (WBC)	4.0-11.0 x 10 ³ /mm ³	
	P	60-75%	
	L	20-40%	
	M	4-8%	
	B	0-1%	
	E	1-3%	
	Platelet (Plt)	200-400 x 10 ³ /mm ³	
27.	ESR		
	Male	0-10 mm/jam (Wintrobe)	
	Female	0-15 mm/jam (Wintrobe)	
28.	Hematocrit		
	Male	45-52%	
	Female	37-48%	
29.	Hemoglobine (Hgb)		
	Male	13-18 g/dl	
	Female	12-16 g/dl	
30.	Prothrombin time (PT)	75-100% nilai asas	
31.	APTT	25-37 saat	
32.	Creatinine Clearance (CrCl)	105-150 ml/min/1.73 m ²	
33.	TT ₄	3.0-7.5 mcg/dl	
34.	RT ₃ U	25-35%	
35.	FTI	1.3-4.2	

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NORMAL HEMODYNAMIC VALUES AND DERIVED INDICES

Normal Value Units

BP S/D/M	Blood Pressure Systolic/Diastolic/Mean	120/80/93	mm Hg
CO	Cardiac Output	4-6	Liters/min.
RAP	Right Atrial Pressure (Mean)	2-6	mm Hg
PAP S/D/M	Pulmonary Artery Pressure Systolic/Diastolic/Mean	25/12/16	mm Hg
PCWP	Pulmonary Capillary Wedge Pressure (mean)	5-12	mm Hg
CI	Cardiac Index	2.5-3.5	Liters/min/m ²
	$CI = \frac{CO}{\text{Body Surface Area}}$		
SV	Stroke Volume	60 - 80	ml/beat
	$SV = \frac{CO}{\text{Heart Rate}}$		
SVI	Stroke Volume Index	30 - 50	ml/beat/m ²
	$SVI = \frac{SV}{\text{Body Surface Area}}$		
PVR	Pulmonary Vascular Resistance	< 200	dynes.sec.cm ⁻⁵
	$PVR = \frac{MPAP - PCWP}{CO} \times 80$		
TPVR	Total Peripheral Vascular Resistance	900-1400	dynes.sec.cm ⁻⁵
	$TPVR = \frac{MBP - RAP}{CO} \times 80$		
LVSWI	Left Ventricular Stroke Work Index	35-80	gm-m/m ² /beat
	$LVSWI = (MBP-PCWP) (SVI) (.0136)$		